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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/802,468	03/16/2004	Ronald N. Perry	MERL-1559	4079

7590 03/22/2005
Patent Department
Mitsubishi Electric Research Laboratories, Inc.
201 Broadway
Cambridge, MA 02139

EXAMINER

SINGH, DALIP K

ART UNIT	PAPER NUMBER
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2676

DATE MAILED: 03/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)	
10/802,468	PERRY ET AL.	
Examiner	Art Unit	
Dalip K Singh	2676	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 5-28-2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 1-3, 8, 9, 13 & 14 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,875,468 to Erlichson et al.

a. Regarding claim 1, Erlichson et al. **discloses** a processing pipeline (...computer system 400 includes multiple processing nodes 401-406 for processing data...these nodes 401-406 communicate with each other...via a general purpose interconnection network 407...col. 5, lines 47-56); a progressive cache including a plurality of caches, each cache for a corresponding stage (...each of these nodes 401-406 includes one cache...col. 5, lines 47-56); and a cache controller configured to route cache elements from the processing pipeline to the progressive cache (...an epoch and cache controller 506 is used to control the operation of the cache memory 504...col. 6, lines 1-15).

b. Regarding claims 2 and 3, Erlichson et al. **discloses** the progressive cache includes a cache for each stage of the processing pipeline (...each of these nodes 401-406 includes one cache...the processors execute a computer...perform read, write and synch operations to a single cache memory 504 which is shared amongst the different processors...col. 5, lines 57-67).

c. Regarding claim 8, it is similar in scope to claim 1 above and is rejected under the same rationale.

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d. Regarding claim 9, it is similar in scope to claim 2 above and is rejected under the same rationale.

e. Regarding claims 13 and 14, they are similar in scope to claim 1 above and are rejected under the same rationale.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 4-7, 10, 11 & 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,875,468 to Erlichson et al. as applied to claim 1 above, and further in view of U.S. Patent No. 6,717,577 B1 to Cheng et al.

a. Regarding claim 4, Erlichson et al. **does not disclose** compressing cache elements. Cheng et al. **discloses** a vertex cache being utilized in a processing pipeline and data being compressed for storage in the cache (...Fig. 1B shows a...3D graphics pipeline 116...a vertex cache 212...col. 5, lines 57-67; col. 6, lines 1-67;...the vertex data includes...compressed data streams...these various data formats can...be stored in the common vertex cache...and subsequently decompressed..for the graphics display pipeline...col. 3, lines 56-67). Therefore, it would have been obvious to a person of ordinary skill in the art at the time invention was made to modify Erlichson invention with the feature "cache storage with compression" as taught by Cheng et al. **because** it results in saving memory space.

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b. Regarding claim 5, Erlichson et al. **does not explicitly disclose** making use of hashing to access cache elements. Cheng et al. **implicitly** discloses hashing (...each primitive within primitive list 302 indexes corresponding vertices...a single vertex within vertex list 304 may be used by multiple primitives within primitive list...col. 8, lines 30-56;...any vertex component can be index-referenced...col. 6, lines 55-67; col. 7, lines 1-5). Therefore, it would have been obvious to a person of ordinary skill in the art at the time invention was made to modify Erlichson invention with the feature “indexed arrays for cache elements” as taught by Cheng et al. **because** it results in efficient cache elements storage.

c. Regarding claim 6, Erlichson-Cheng combination **fails to disclose** least recently used cache elements being discarded when the cache is full. Official notice is taken that both the concept and the advantages of discarding least recently used cached elements when a cache is full are well known and expected in the design of cache are. Therefore, it would have been obvious to a person of ordinary skill in the art at the time invention was made to include “discarding of least recently used cache elements when the cache is full” as it provides for efficient cache operation by keeping most recently used cache elements, a fundamental design goal/basis of a cache.

d. Regarding claim 7, Erlichson-Cheng combination **discloses** a graphics pipeline with input being a graphics object and the output being an image (Please Fig. 1B).

e. Regarding claim 10, it is similar in scope to claim 4 above and is rejected under the same rationale.

f. Regarding claim 11, it is similar in scope to claim 5 above and is rejected under the same rationale.

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g. Regarding claim 12, it is similar in scope to claim 6 above and is rejected under the same rationale.

Conclusion

1. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Dalip K. Singh** whose telephone number is (571) 272-7792. The examiner can normally be reached on Mon-Thu (8:00AM-6:30PM) Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Matthew Bella**, can be reached at (703) 272-7778.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

dk

March 15, 2005



**MATTHEW C. BELLA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600**